ARTICLE 24-02

ELECTRICAL WIRING STANDARDS

Chapter
24-02-01 General Conditions and Electrical Wiring Standards

CHAPTER 24-02-01
GENERAL CONDITIONS AND ELECTRICAL WIRING STANDARDS

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24-02-01-01. Definitions. The terms used throughout this chapter have the same meaning as in the National Electrical Code except:

1. "Correction order" means a notice, written by an electrical inspector to the person responsible for the electrical installation, stating violations and noncompliance of rules and regulations as listed, shall be corrected within a designated time.

2. "E-cert" is an electronic version of a wiring certificate.

3. "Kitchen" means an area where food is prepared that includes a sink and one or more permanent cooking appliances.

4. "Qualified person" means a person licensed by the North Dakota state electrical board.

5. "Recreational vehicle site" means any plot of ground intended for the connection of recreational vehicles.

6. "Service" means the conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

7. "Service point" means the point of demarcation between the serving utility and the premises wiring. The service point is the point on the wiring system where the serving utility ends and the premises wiring begins. The serving utility generally specifies the location of the service point.

8. "Wiring certificate" means a document consisting of one or more copies that certifies electrical wiring and equipment was installed on premises and was done in strict compliance with all the provisions of North Dakota Century Code chapter 43-09 and all the requirements of the state electrical board.

History: Amended effective January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-02. General statement of policy and interpretative rules. There are three categories of licensed electricians recognized by the electrical board.

1. Licensed electricians and the qualifications required for each to apply for examination:

   a. A master electrician shall have at least one year's experience working as a licensed journeyman electrician under the supervision of a contracting master electrician.

   b. A journeyman electrician shall have at least four years' (8,000 hours total, maximum 2,000 hours per year) experience registered as an apprentice electrician (of which up to eighteen months may apply under the qualifications of a class B electrician) under the supervision of a contracting master licensed electrician in an area where electrical construction work is done in the jurisdiction regulating similar rules of the state of North Dakota. One year's credit will be granted for a graduate of a two-year or more electrical school accepted by the state electrical board. The person

shall have the necessary qualifications, training, and technical knowledge to wire, install, and repair electrical apparatus and equipment in accordance with the standard rules and regulations of the National Electrical Code.

c. A class B electrician shall have at least eighteen months' (3,000 hours total, maximum 2,000 hours per year) experience in farmstead or residential wiring under the supervision of a master or class B electrician.

Commercial wiring experience will not be credited for experience toward a class B license. Six months' credit will be granted for a graduate of a two-year electrical school approved by the state electrical board.

d. Upon receiving an application for an electrician's license from an applicant, the state electrical board shall forward an employment verification record to the appropriate parties listed in the application. Upon receiving verification of electrical construction experience as outlined under this section and upon final approval of the application by the state electrical board, the applicant shall be sent an invitation to take the examination. The invitation shall outline the available testing dates for the year. Upon receiving the invitation, the applicant shall contact the state electrical board and inform the board as to the date chosen to take the examination.

2. Apprentice electricians. There are two categories of apprentice electricians.

a. Apprentice electricians under the joint apprenticeship training committee training program approved by the department of labor.

b. Electrician trainees who may not be eligible for the joint apprenticeship training committee program and other persons desiring to accumulate a sufficient time and capability in the electrical trade to qualify them to apply for permission to take the examination for the journeyman electrician's license.

Any person may work as an apprentice under a licensed master or class B electrician, but the master or class B electrician shall not allow an apprentice to work on any installation without direct constant supervision by a North Dakota licensed electrician working with the apprentice at the worksite. A licensed electrician shall supervise not more than three apprentices.

Electrical contractors shall maintain records of all employees who are or will be performing electrical work for that electrical contractor and shall permit the electrical board to examine and copy all such records as required by this section.

Any master or class B electrician who fails or refuses to comply with this section or who fails or refuses to comply or demonstrate compliance with this section at the request of the board or its representative shall subject that person's license to nonrenewal, suspension, or revocation by the board.

3. Master and class B electricians. A master or class B electrician may exercise that person's privileges as a licensed master or class B electrician for no more than one shop or business, and shall comply with provisions as required for contracting with the secretary of state's office as stated in North Dakota Century Code chapter 43-07. A master or class B electrician shall notify the state electrical board office immediately upon changing from contracting status to noncontracting status for the shop or business they represent.

4. Maintenance personnel regularly employed by the owner may maintain or make minor repairs to existing electrical wiring devices and appliances, but are precluded from extending or changing the characteristics of existing circuits, feeders, or other electrical apparatus.

5. Purpose and scope. The purpose of these standards is the practical safeguarding of persons and of buildings and building contents from electrical hazards arising from the use or control of electricity for light, heat, power, and control thereof and of the fire detection system. It covers the electrical conductors and equipment installed within or on public and private buildings and other premises, including yards, carnival and parking lots, railroad right of way and, also the conductors that supply streetlighting, with the associated equipment necessary to its safe operation.

   These standards, based on the National Electrical Code, are the result of years of experience and research to meet the demand for uniform standards to govern electrical wiring in North Dakota, and provide basic rules for intelligent and uniform installation and inspection.

   All requirements contained herein shall be given careful consideration to ensure greatest permanence, convenience, and safety. These standards do not constitute a design specification for any particular installation, nor an instruction manual for untrained persons. Skill and experience are necessary factors for a safe and adequate wiring installation. In cases where these requirements differ or are in conflict with the requirements of the NFPA 70 2005 edition National Electrical Code and NFPA 101 2003 edition Life Safety Code, and applicable articles in currently adopted state building code pertaining to fire detection, fire alarms, fire communications, and smoke detectors, the more restrictive requirements shall be the minimum.

6. Administrative powers and duties. The executive director of the state electrical board, under the direction of the board, shall administer laws,

rules, and wiring standards of this state, the electrical requirements of the NFPA 70 2005 edition National Electrical Code and NFPA 101 2003 edition Life Safety Code, and applicable articles in currently adopted state building code pertaining to fire detection, fire alarms, fire communications, and smoke detectors. In all cases when any action is taken by the executive director to enforce the provisions of any sections contained in these electrical regulations, the NFPA 70 2005 edition National Electrical Code and NFPA 101 2003 edition Life Safety Code, such acts shall be done in the name of and on behalf of the state.

The electrical regulations of these standards, the NFPA 70 2005 edition National Electrical Code and NFPA 101 2003 edition Life Safety Code, may be modified or waived by special permission in particular cases when such modification or waiver is specifically permitted or in particular cases when an advancement in the technology of electricity makes such modification or waiver advisable in the best interest of the people of North Dakota. Such "special permission" shall, in all cases, be obtained from the executive director in writing prior to the commencement of the work.

Whenever the board is authorized or mandated by law to inspect an electrical installation, the inspector has authority to enter upon land for the purpose of conducting the inspection. Except in emergency circumstances, the inspector shall request permission from the property owner or agent prior to entering a dwelling, other building, or other place so enclosed as manifestly to exclude intruders. If the landowner refuses to give permission, the board may request the district court of the district containing the property for an order authorizing the inspector to enter the property to conduct the inspection. Emergency circumstances include situations presenting imminent danger to health, safety, or property.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-03. General requirements. Electrical installations shall be planned to provide adequate capacity for the load.

1. Wiring systems shall have conductors of sufficient capacity to furnish each outlet without excessive line loss or voltage drop. The voltage drop shall not exceed five percent at the farthest outlet of power, heating and lighting loads, or combinations of such loads. (See appendix for example.)

2. All wiring materials shall be listed by nationally recognized testing laboratories to safeguard life and property. It is the duty of the electrical installer to secure permission from the executive director to use materials, devices, and methods of installation not specifically covered

by these standards. Equipment not approved under a testing laboratory category shall be evaluated by a registered professional engineer on state-accepted evaluation forms.

3. All installations shall be made in a workmanlike manner with special attention paid to the mechanical execution of work. All conductors shall be rigidly supported and all fittings securely fastened.

4. When wiring public school buildings, approval shall be received from the department of public instruction and the state electrical board.

5. Overhead conductors shall not cross over water wells or known sites where water wells may be drilled. A minimum distance of twenty feet [6.10 meters] in all directions shall be maintained for overhead conductors.

6. All hospitals, nursing homes, and related patient care areas along with dormitories designed to house more than sixteen people shall be wired in metal raceway. Portable cleaning equipment receptacle outlets shall be installed in corridors and located so that no point in the corridor along the floorline, measured horizontally, is more than twenty-five feet [7.62 meters] from an outlet. Spacing of receptacle outlets for dormitories and assisted living shall be in conformity with section 210-60, 2005 edition, National Electrical Code.

7. In the wiring of nursing homes and hospitals, reference shall be made to the state department of health for special requirements pertaining to operating rooms, delivery rooms, and emergency lighting.

8. Aluminum conductors in sizes smaller than no. 6 shall not be used. Aluminum conductors installed and all corresponding materials shall be approved by testing laboratories.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-04. Places of assembly. This section covers all buildings, structures, or portions of buildings designed or intended for the assembly of one hundred or more persons.

Places of assembly include: assembly halls, auditoriums, including auditoriums in schools; mercantile, business, and other occupancies; exhibition halls; armories; dining facilities, including restaurants; church chapels; dancehalls; mortuary chapels; museums; skating rinks; gymnasiums and multipurpose rooms; bowling lanes; poolrooms; clubrooms; places of awaiting transportation; courtrooms; drinking establishments; and conference rooms.

Occupancy of any room or space for assembly purposes by less than one hundred persons in a building of other occupancy, and incidental to such other occupancy, shall be classed as part of the other occupancy and subject to the applicable provisions.

When such building structures or portions thereof contain a projection booth or stage platform or area for the presentation of theatrical or musical production, either fixed or portable, the wiring for that area shall comply with all applicable provisions of article 520, 2005 edition, National Electrical Code.

(For methods of determining population capacity, see occupant load value table, section 24-02-01-16.)

1. **Hazardous (classified) locations.** Hazardous areas located in any assemblage occupancy shall be installed in accordance with article 500, 2005 edition, National Electrical Code, hazardous locations.

2. **Wiring methods.** The fixed wiring method including fire alarms shall be metal raceway (and metal boxes) or nonmetallic raceway encased in not less than two inches [5.08 centimeters] of concrete.

   Exception 1: As provided in article 640, 2005 edition, National Electrical Code, sound reproduction and similar equipment; in article 800, 2005 edition, National Electrical Code, communication circuits; and in article 725, 2005 edition, National Electrical Code, for class 2 and class 3 remote control and signaling circuits.

   Exception 2: Listed two-hour fire-rated cables as permitted in article 695.6e and article 700-9, 2005 edition, National Electrical Code.

   Adjacent areas separated by a fire barrier shall be considered a separate building and may be wired in any approved wiring method in chapter 3 of the 2005 edition, National Electrical Code. For the purpose of this section, a fire barrier is defined as a continuous assembly, vertical or horizontal, in accordance with currently adopted state building code. In no case shall it be less than two-hour fire-rated.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-05. Hazardous locations.

1. Hazardous locations shall be wired in accordance with articles 500-516. For classifications of oilfield installations refer to RP 500, Classification of Locations for Electrical Installations at Petroleum Facilities, second edition, November 1997.

2. Electrical wiring in grain elevators shall conform with code requirements, class II, division 1, under article 500, 2005 edition, National Electrical Code.

    a. Surge arrestors shall be provided for all services in grain elevators.

    b. Hot bearing or other similar detection systems shall be installed in accordance with articles 500-516, 2005 edition, National Electrical Code.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-06. Grounding. Grounding shall conform to article 250, 2005 edition, National Electrical Code.

1. At motor connections, a bonding jumper sized in accordance with table 250-122, 2005 edition, National Electrical Code, shall be provided around all flexible conduit in sizes one-half inch [12.70 millimeters] and larger. The bonding jumper is not required where a separate grounding conductor is included.

2. Grounding of metal outdoor lighting standards. Definition of lighting standard is a pole exceeding twelve feet [3.66 meters] in height measured from the bottom of the base or from the intended grade level of poles.

    a. Circuits run in nonmetallic conduit or buried directly in the ground: the metal lighting standard shall be grounded by use of an equipment grounding conductor, not the neutral conductor. This equipment grounding conductor shall be run continuously throughout the system and properly bonded to each standard by use of lugs.

    b. The metal lighting standard shall be connected to a one-half inch [12.70 millimeters] by ten-foot [3.05-meter] copperweld ground rod by the means of a bonding jumper. The ten-foot [3.05-meter] ground rod shall be driven in the center of the metal standard base and project slightly above the base. Both ground rod and equipment grounding conductor shall be connected to the metal standards. The bonding jumper shall be in accordance with 2005 edition, National Electrical Code, and in no case smaller than no. 8 copper or no. 6 aluminum.

3. The grounding electrode conductor shall be connected to the grounded service conductor in the enclosure for the service disconnect.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-07. Branch circuits and feeders. Branch circuits and feeders shall comply with articles 210 and 215, 2005 edition, National Electrical Code.

1. The total connected load shall be divided as evenly as practicable, between the two ungrounded conductors of a three-wire system and three conductors of a four-wire wye system.

2. A separate circuit with disconnect shall be provided for the purpose of operating or controlling electrical equipment on heating units. Wiring requirements for fixed electrical space heating equipment is provided under article 424, 2005 edition, National Electrical Code.

3. Dwelling occupancies having built-in baking or cooking units installed separately shall have an individual disconnect and overcurrent protective device. Conductors supplying these units shall have a carrying capacity according to nameplate rating.

4. A minimum of six 20-amp small appliance branch circuits shall be installed for counter receptacles in kitchens that may be used to serve public gatherings at schools, churches, lodges, and similar buildings. Any island counter in public gatherings shall have at least one receptacle.

5. Dwelling occupancies. A minimum of three 20-amp small appliance branch circuits shall be installed to supply receptacle outlets in kitchen, pantry, dining room, and breakfast room. These circuits shall not supply other outlets and shall have conductors not smaller than no. 12. Two of these circuits shall supply receptacle outlets on or near work counter area and so arranged that adjacent receptacles are not on the same circuit.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-08. Services. Electrical services shall comply with article 230, 2005 edition, National Electrical Code.

1. Perpendicular mast used for support of a service shall not be less than two-inch [5.08-centimeter] galvanized rigid steel conduit or intermediate metal conduit, fitted with storm collar flashing.

2. To eliminate moisture condensation, a suitable compound shall be installed to prevent circulation of air from a warmer to a colder section of the raceway (see section 300-7, 2005 edition, National Electrical Code).

3. Outside switch location. In no case shall the equipment be mounted lower than two feet [.6096 meter] above grade level unless listed for such purpose.

   All services in one-family dwellings shall be located in a single accessible location.

   Exception: Special permission may be granted by the electrical inspector for a second service location to be added where there is no available space for the service equipment. The second service location shall be installed in accordance with article 230-2, 2005 edition, National Electrical Code.

4. Rating of service switch. Any new or old single-family dwelling where the main house panel is altered, the dwelling is moved, or where the dwelling is rewired, a minimum one hundred ampere service-rated panel shall be installed.

   a. A one hundred ampere main house panel shall be installed using ungrounded conductors rated at one hundred amperes. The panel shall contain provisions for a minimum of twenty full-sized branch circuit spaces.

   b. A two hundred ampere or larger main house panel shall be installed using ungrounded conductors sized for the proper ampacity. The panel or panels shall contain provisions for a minimum of forty full-sized branch circuit spaces.

   c. Service and feeder calculation for electric heating loads shall be sized to one hundred twenty-five percent of the full load rating.

5. Underground services. Underground service shall comply with article 230, part III, 2005 edition, National Electrical Code. Cables or individual conductors on outside of buildings or poles shall be protected where subject to mechanical damage. Where rigid metal conduit is used, a bushing shall be used on both ends. Sufficient slack conductor shall be left to allow for ground settling next to foundations. Past experience

indicates that the ground next to a foundation has settled as much as three feet [.914 meter].

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-09. Overcurrent protection. Overcurrent protection shall comply with article 240, 2005 edition, National Electrical Code. Exterior overcurrent devices shall be located at a height of no less than two feet [.6096 meter] above grade level to the bottom of the enclosure.

Lighting, appliance, and power panel boards may not be located in bathrooms, clothes closets, stairways, or crawl space.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-10. Wiring methods.

1. Agricultural buildings. This section covers all buildings housing livestock, poultry, and other areas of similar or like nature. All electrical panel boards, wiring devices, and equipment shall be installed in accordance with the provisions of article 547, 2005 edition, National Electrical Code.

   A site-isolating device shall be permitted to be installed at the distribution point where two or more agricultural building structures are supplied from the distribution point.

2. Electric metallic tubing shall not be used in concrete below grade, in concrete slab or masonry in direct contact with earth. A vapor barrier, if used, will have no effect on the requirements of the section. Electric metallic tubing shall not be embedded in earth or fill.

3. Aluminum conduit shall not be installed in contact with earth or embedded in concrete.

4. The installation of rigid nonmetallic conduit shall comply with the provision of article 352, 2005 edition, National Electrical Code. Expansion fittings for rigid nonmetallic conduit shall be provided to compensate for thermal expansion and contraction in accordance with section 352.44, 2005 edition, National Electrical Code. When installed

outdoors and above grade, one hundred forty degrees Fahrenheit [60 degrees Celsius] shall be considered the minimum change in degrees.

5. Fertilizer rooms, meatpacking plants, salt processing plants, and similar locations are judged to be occupancies where severe corrosive conditions are likely to be present. It is recommended that nonmetallic conduit with nonmetallic boxes and fittings be used as the wiring method for such occupancies. Ferrous and nonferrous metal raceways shall be used providing the raceway, boxes, and fittings are properly protected against corrosion.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-10.1. Water-damaged electrical equipment. Electrical wiring and equipment exposed to water damage shall comply with the following:

1. All breaker panel boards, breakers, fuses, disconnect switches, controllers, receptacles, switches, light fixtures, and electric heaters that have been submerged shall be replaced or all electrical equipment, switchgear, motor control centers, boilers and boiler controls, electric motors, transformers, and other similar equipment such as appliances, water heaters, dishwashers, ovens, and ranges that have been submerged shall be reconditioned by the original manufacturer or by its approved representative or replaced.

2. Electrical wiring may require replacement depending on the type of wire or cable and what application it was listed for.

3. Splices and terminations shall be checked to make sure they comply with article 110-14, 2005 edition, National Electrical Code.

Other recommendations can be found in "Guidelines for Handling Water Damaged Electrical Equipment" published by the national electrical manufacturers association (NEMA).

History: Effective January 1, 1999; amended effective April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-11. Motors, motor circuits, and controllers. Repealed effective January 1, 1999.

24-02-01-12. Boxes and fittings. Not more than one extension ring may be used on outlet boxes unless special permission has been obtained from the electrical inspector having jurisdiction. Boxes or conduit bodies shall be installed at

each opening, splice, or connection, except as provided in article 604, 2005 edition, National Electrical Code.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-13. Seasonal dwellings. Repealed effective January 1, 1999.

24-02-01-14. Mobile home parks and recreational vehicle parks. Repealed effective January 1, 1999.

24-02-01-14.1. Mobile home parks and recreational vehicle parks. Mobile homes, manufactured homes, and mobile home parks shall comply with articles 550 and 551; 2005 edition, of the National Electrical Code.

Service equipment may be installed on manufactured homes as required in article 550.32(b) if the following requirements are met:

1. The mobile home is located on property owned by homeowner and not in mobile home park.

2. The mobile home is secured to a permanent foundation that complies with currently adopted state building code.

History: Effective April 1, 2002; amended effective April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-15. Athletic field lighting. Repealed effective January 1, 1999.

24-02-01-16. Marking of means of egress, illumination of means of egress, and emergency lighting. The purpose of this section is to provide exit and emergency lighting requirements in accordance with Life Safety Code, NFPA 101, 2003 edition, in simple and condensed form. For occupancies or items not covered in this condensed version, refer to NFPA 101, 2003 edition, for complete details. In the wiring of institutional occupancies, governmental agencies may use other codes, which may be more stringent, especially when federal funds are involved.

1. Marking of means of egress. All required exits and access to exits shall be marked by readily visible signs. For externally illuminated signs, letters shall be not less than six inches [15.24 centimeters] high. Internally illuminated signs shall be listed per UL 924 which assures proper letter size. Chevron-shaped arrows are required to indicate direction to exits. Every sign shall be suitably illuminated. For externally illuminated signs see section 7.10.6, Life Safety Code,

NFPA 101, 2003 edition and for internally illuminated signs see section 7.10.7.

2. Illumination of means of egress. Illumination of means of egress shall provide continuous, dependable, illumination of not less than one foot-candle at floor level for all areas such as corridors, stairways, and exit doorway, providing a lighted path of travel to the outside of the building and public way during all times that the means of egress is available for use. For new stairs, the required minimum illumination level is ten foot-candle during conditions of stair use. Illumination shall be from a source of reasonable assured reliability and may be supplied from normal lighting circuits or special circuits with switching controlled by authorized personnel. Illumination required for exit marking shall also serve for illumination of means of egress and shall be so arranged that failure of a single unit such as burning out of a single bulb will not leave any area in darkness.

3. Emergency lighting. Emergency lighting systems shall be so arranged to provide the required illumination automatically in event of any interruption or failure of the normal power supply. An acceptable alternate source of power may be an electric generator or approved battery. In occupancies where emergency lighting is required, the circuits supplying exit marking and illumination of means of egress shall be supplied by the emergency system. Other areas of the facilities only requiring exit marking and illumination of means of egress may be supplied by the normal source.

4. Classification of occupancy based on chapter 6, Life Safety Code, NFPA 101, 2003 edition.

   Note: Check with local building official to determine occupancy and occupant load.

   Assembly. Assembly occupancies include all buildings or portions of buildings used for gathering together fifty or more persons for such purposes as deliberation, worship, entertainment, eating, drinking, amusement, or awaiting transportation. Assembly occupancies also include special amusement buildings regardless of occupant load.

   Assembly occupancies include the following:

Armories	Libraries
Assembly halls	Mortuary chapels
Auditoriums	Motion picture theaters
Bowling lanes	Museums
Clubrooms	Passenger stations and terminals of air, surface, underground, and marine public transportation facilities

College and university classrooms, fifty persons and over	Places of religious worship
Conference rooms	Poolrooms
Courtrooms	Recreation piers
Dancehalls	Restaurants
Drinking establishments	Skating rinks
Exhibition halls	Theaters
Gymnasiums	

Occupancy of any room or space for assembly purposes by fewer than fifty persons in a building or other occupancy and incidental to such other occupancy shall be classified as part of the other occupancy and shall be subject to the provisions applicable thereto.

Educational. Educational occupancies include all buildings or portions of buildings used for educational purposes through the twelfth grade by six or more persons for four or more hours per day or more than twelve hours per week.

Educational occupancies include the following:

Academies	Nursery schools
Kindergartens	Schools

Other occupancies associated with educational institutions shall be in accordance with the appropriate part of Life Safety Code, NFPA 101, 2003 edition.

In cases when instruction is incidental to some other occupancy, the section of Life Safety Code, NFPA 101, 2003 edition, governing such other occupancy applies. For example:

Classrooms under fifty persons - business occupancy

Classrooms fifty persons and over - assembly

Instructional building - business occupancy

Laboratories, instructional - business occupancy

Laboratories, noninstructional - industrial

Day care. Day care occupancies include all buildings or portions of buildings in which four or more clients receive care, maintenance, and supervision, by other than their relatives or legal guardians, for less than twenty-four hours per day.

Day care occupancies include the following:

- Child day care occupancies
- Adult day care occupancies, except where part of a health care occupancy
- Nursery schools
- Day care homes
- Kindergarten classes that are incidental to a child day care occupancy

In cases when public schools offer only half-day kindergarten programs, many child day care occupancies offer state-approved kindergarten classes for children who require full day care. As these classes are normally incidental to the day care occupancy, the requirements of the day care occupancy should be followed.

Health care. Health care occupancies are those used for purposes such as medical or other treatment or care of persons suffering from physical or mental illness, disease, or infirmity and for the care of infants, convalescents, or infirm aged persons. Health care occupancies provide sleeping facilities for four or more occupants and are occupied by persons who are mostly incapable of self-preservation because of age, physical or mental disability, or because of security measures not under the occupants' control.

Health care occupancies include the following:

- Hospitals
- Nursing homes
- Limited care facilities

Ambulatory health care. Ambulatory health care occupancies are those used to provide services or treatment simultaneously to four or more patients on an outpatient basis. The patients are considered incapable of self-preservation due to the treatment rendered, the use of anesthesia, or the injury for which they are receiving emergency or urgent care.

Detention and correctional. Detention and correctional occupancies are used to house individuals under varied degrees of restraint or security and are occupied by persons who are mostly incapable of self-preservation because of security measures not under the occupants' control.

Detention and correctional occupancies include the following:

Adult and juvenile substance abuse centers

Adult and juvenile work camps

Adult community residential centers

Adult correctional institutions

Adult local detention facilities

Juvenile community residential centers

Juvenile detention facilities

Juvenile training schools

Residential. Residential occupancies are those occupancies in which sleeping accommodations are provided for normal residential purposes and include all buildings designed to provide sleeping accommodations.

Exception. Those classified under health care or detention and correctional occupancies.

Residential occupancies are treated separately in Life Safety Code, NFPA 101, 2003 edition, in the following groups:

One-family and two-family dwellings

Lodging or rooming houses

Hotels, motels, and dormitories

Apartment buildings

Residential board and care facilities

Mercantile. Mercantile occupancies include stores, markets, and other rooms, buildings, or structures for the display and sale of merchandise.

Mercantile occupancies include the following:

Auction rooms

Department stores

Drugstores

Shopping centers

Supermarkets

Office, storage, and service facilities incidental to the sale of merchandise and located in the same building are included with mercantile occupancy.

Business. Business occupancies are those used for the transaction of business other than those covered under mercantile, for the keeping of accounts and records, and for similar purposes.

Business occupancies include the following:

- Air traffic control towers (ATCTs)
- City halls
- College and university instructional buildings, classrooms under fifty persons, and instructional laboratories
- Courthouses
- Dentists' offices
- Doctors' offices
- General offices
- Outpatient clinics, ambulatory
- Townhalls

Doctors' and dentists' offices are included unless of such character as to be classified as ambulatory health care occupancies.

Industrial. Industrial occupancies include factories making products of all kinds and properties devoted to operations such as processing, assembling, mixing, packaging, finishing or decorating, and repairing.

Industrial occupancies include the following:

- Drycleaning plants
- Factories of all kinds
- Food processing plants
- Gas plants
- Hangars (for servicing or maintenance)
- Laundries
- Power plants
- Pumping stations
- Refineries
- Sawmills
- Telephone exchanges

In evaluating the appropriate classification of laboratories, the authority having jurisdiction should determine each case individually based on the extent and nature of the associated hazards. Some laboratories may be classified as occupancies other than industrial, for example, a physical therapy laboratory or a computer laboratory.

Storage. Storage occupancies include all buildings or structures utilized primarily for the storage or sheltering of goods, merchandise, products, vehicles, or animals.

Storage occupancies include the following:

- Barns
- Bulk oil storage
- Cold storage
- Hangars (for storage only)
- Parking structures
- Stables

Freight terminals	Truck and marine terminals
Grain elevators	Warehouses

Storage occupancies are characterized by the presence of relatively small numbers of persons in proportion to the area. Any new use that increases the number of occupants to a figure comparable with other classes of occupancy changes the classification of the building to that of the new use.

Mixed occupancies. Where two or more classes of occupancy occur in the same building or structure and are intermingled so that separate safeguards are impracticable, means of egress facilities, construction, protection, and other safeguards shall comply with the most restrictive life safety requirements of the occupancies involved.

5. Occupant load factor table.

Use	Square Feet Per Person	
Assembly use	15	net*
Areas of concentrated use without fixed seating	7	net
Waiting space	3	net
Bleachers, pews, and similar bench-type seating		Note 1
Fixed seating		Note 2
Kitchens	100	gross**
Libraries		
In stack areas	100	gross
In reading rooms	50	net
Swimming pools		
Water surface	50	gross
Pool decks	30	gross
Stages	15	net
Educational use		
Classroom area	20	net
Shops, laboratories, and similar vocational areas	50	net
Day care use		
Maximum number of persons intended to occupy that floor, but not less than	35	net
Health care use		

Sleeping departments	120	gross
Inpatient departments	240	gross
Detention and correctional use		
Maximum number of persons intended to occupy that floor, but not less than	120	gross
Residential use		
Hotels, motels, dormitories, apartment buildings:		
Maximum probable population, but not less than	200	gross
Lodging or roominghouses:		
Sleeping accommodations for a total of sixteen or fewer persons on either a transient or permanent basis, with or without meals, but without separate cooking facilities or individual occupants	No requirements	
One-family and two-family dwellings	No requirements	
Residential board and care use		Note 3
Mercantile use (including malls)		
Street level and below (sales)	30	gross
Upper floor (sales)	60	gross
Office areas	100	gross
Storage, receiving, or shipping (not open to the general public)	300	gross
Assembly areas	See	"Assembly"
Business use		
Business purposes	100	gross
Other purposes		Note 4
Industrial use		
Maximum number of persons intended to occupy that floor but not less than	100	gross
Storage use		
No occupant load factor specified		

* Net floor area is the actual occupied area, not including accessory unoccupied areas or thickness of walls.

** Gross floor area is the floor area within the inside perimeter of the outside walls of the building under consideration with no deduction for hallways, stairs, closets, thickness of interior walls, columns, or other features.

Notes to occupant load table.

Note 1. Bleachers, pews, and similar bench-type seating: one person per eighteen linear inches [45.72 centimeters].

Note 2. Fixed seating. The occupant load of an area having fixed seats shall be determined by the number of fixed seats installed. Required aisle space serving the fixed seats shall not be used to increase the occupant load.

Note 3. Refer to chapters 32 and 33 of Life Safety Code, NFPA 101, 2003 edition.

Note 4. Occupant load factors associated with the use.

6. Building classification table.

x - indicates required
o - indicates not required

Occupancy	Marking of Means Egress	Illumination of Means Egress	Emergency Lighting	
Assembly	x	x	x	
Educational	x	x	x	
Interior stairs and corridors	x	x	x	
Normally occupied spaces	x	x	x	Note 6
Flexible and open plan buildings	x	x	x	
Interior or windowless portions of buildings	x	x	x	
Shops and laboratories	x	x	x	
Day care	x	x	x	
Interior stairs and corridors	x	x	x	
Normally occupied spaces	x	x	x	Note 6
Flexible and open plan buildings	x	x	x	
Interior or windowless portions of buildings	x	x	x	
Shops and laboratories	x	x	x	
Family day care homes (more than three but fewer than seven persons)	o	x	o	
Group day care homes (seven to twelve persons)	o	x	o	
Health care occupancies (Note 1) (for complete details see Article 517 of NEC and NFPA Standard 99)	x	x	x	
Detention and correctional	x	x	x	
Residential				
Hotels and dormitories	x	x	o	
More than twenty-five rooms	x	x	x	Note 2
Apartment buildings				

Twelve or less apartments	x		x	o	Note 3
More than twelve apartments or greater than three floors	x		x	x	Note 3
Residential board and care					
More than sixteen	x		x	x	
Mercantile					
Class A - over thirty thousand square feet [2787.09 square meters]	x		x	x	
Class B - three thousand to thirty thousand square feet [278.71 square meters to 2787.09 square meters]	x		x	x	
Class C - under three thousand square feet [278.71 square meters]	x	Note 7	x	o	
Malls	x		x	x	
Business	x		x	o	
Two or more stories above exit discharge	x		x	x	
Fifty or more persons above or below level of exit discharge	x		x	x	
Three hundred or more persons	x		x	x	
All windowless and underground	x		x	x	
Industrial	x		x Note 8	x	Notes 8 & 9
Storage	x		x Note 10	x	Notes 10 & 11

Special structures (refer to chapter 11, Life Safety Code, NFPA 101, 2003 edition).

Mixed occupancies (Note 5).

NOTES:

Note 1. Exception: Power supply for exit and emergency lighting shall conform to NFPA 110.

Note 2. Exception: Where each guest room or guest suite has an exit direct to the outside of the building at street or ground level emergency lighting is not required.

Note 3. Exception: Buildings with only one exit need not be provided with exit signs.

Note 5. Exception: Where the same means of egress serve multiple-use or combined occupancies, exit lighting, exit signs, and emergency lighting shall be provided for the occupancy with the most stringent lighting requirements. The occupant load of each type of occupancy shall be added to arrive at the total occupant load.

Note 6. Exception: Rooms with windows to outside (other than assembly use spaces) exempted from emergency lighting requirement.

Note 7. Exception: Where an exit is immediately apparent from all portions of the sales area, the exit marking is not required.

Note 8. Exception: Special purpose industrial occupancies without routine human habitation.

Note 9. Exception: Structures occupied only during daylight hours, with skylights or windows arranged to provide the required level of illumination on all portions of the means of egress during these hours.

Note 10. Exception: Storage occupancies do not require emergency lighting when not normally occupied.

Note 11. Exception: In structures occupied only during daylight hours, with skylights or windows arranged to provide the required level of illumination of all portions of the means of egress during these hours, emergency lighting is not required.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-16.1. Smoke detectors and fire alarm systems requirements for evacuation and life safety. Fire alarms shall be installed in accordance with the currently adopted state building code and state fire code.

1. **Smoke detectors.** Dwelling units, congregate residences, and hotel or lodging house guest rooms that are used for sleeping purposes shall be provided with smoke detectors. Detectors shall be installed in accordance with the approved manufacturer's instructions.

    a. In new construction, required smoke detectors shall receive their primary power from the building wiring when such wiring is served from a commercial source and shall be equipped with a battery backup. The detector shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection. A detector shall be interconnected so all alarms sound when one is activated. If an existing dwelling unit has an interconnected smoke detector system, the rest of the dwelling unit shall be interconnected with the existing smoke detector system.

    b. In dwelling units, a detector shall be installed in each sleeping room and at a point centrally located in the corridor or area giving access to each separate sleeping area. When the dwelling unit has more

than one story and in dwellings with basements, a detector shall be installed on each story and in the basement. In dwelling units where a story or basement is split into two or more levels, the smoke detectors shall be installed on the upper level, except that when the lower level contains a sleeping area, a detector shall be installed on each level. When sleeping rooms are on an upper level, the detector shall be placed at the ceiling of the upper level in close proximity to the stairway. In dwelling units where the ceiling height of a room open to the hallway serving the bedrooms exceeds that of the hallway by twenty-four inches [60.96 centimeters] or more, smoke detectors shall be installed in the hallway and in the adjacent room. In vaulted ceilings, location of the smoke detector shall follow manufacturer's instructions.

2. **Fire alarm systems.** Apartment houses and hotels shall be provided with a manual and automatic fire alarm system in apartment houses three or more stories in height or containing sixteen or more dwelling units, in hotels three or more stories in height or containing twenty or more guest rooms, and in congregate residences three or more stories in height or having an occupant load of twenty or more.

A table in the appendix is offered as a condensed guide for convenience. For further information consult the currently adopted state building code and fire code.

History: Effective February 1, 1996; amended effective January 1, 1999; April 1, 2002.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-17. Carnivals. This section provides standards for temporary outdoor installations of portable electrical wiring and equipment for carnivals and celebrations consisting of overhead and underground installations for lighting and power to tents, stands, concessions, and amusement rides and shall comply with article 525, 2005 edition, National Electrical Code.

1. All temporary outdoor installations shall be approved by the electrical inspector before usage.

2. Inspection and fees for outdoor carnivals and concessions. Each outdoor amusement enterprise or carnival operating or intending to operate in North Dakota shall notify the North Dakota State Electrical Board, Box 857, Bismarck, North Dakota 58502-0857, each year of its itinerary and make application for the initial inspection thirty days before the first engagement in the state. Failure to notify the state electrical board may result in the outdoor amusement enterprise or carnival being responsible for expenses incurred for excess time and travel to inspect these installations.

a. Fees - $10.00 each ride or concession
$10.00 reinspection fee on each unit, if required
$40.00 each transformer or generator truck

b. The fee shall be paid to the inspector at the first engagement or inspection. Each ride or concession will be issued a certification of inspection so that "en route" inspection shall be recorded by each inspector.

c. Each ride or concession wired properly will be issued a certification of compliance, serving for an entire carnival season, subject to subsequent inspections.

d. Each ride or concession having minor code violations will be issued a correction order with instructions to correct the same, before a following engagement, which will require a reinspection with a ten dollar reinspection fee.

e. The electrical inspector is empowered to write a correction order for immediate compliance should the inspector find a condition dangerous to life and property.

History: Amended effective October 1, 1987; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-18. National electrical manufacturers association enclosures. This section provides national electrical manufacturers association standards which apply generally to industrial controls and systems.

In nonhazardous locations, the specific enclosure types, their applications, and the environmental conditions they are designed to protect against, when completely and properly installed, are as follows:

Type 1 - Enclosures constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection against falling dirt.

Type 2 - Enclosures constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment, to provide a degree of protection against falling dirt, and to provide a degree of protection against dripping and light splashing of liquids.

Type 3 - Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow,

and windblown dust; and that will be undamaged by the external formation of ice on the enclosure.

Type 3R - Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, and snow; and that will be undamaged by the external formation of ice on the enclosure.

Type 3S - Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, and windblown dust; and in which the external mechanisms remain operable when ice-laden.

Type 4 - Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, and hose-directed water; and that will be undamaged by the external formation of ice on the enclosure.

Type 4X - Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water, and corrosion; and that will be undamaged by the external formation of ice on the enclosure.

Type 5 - Enclosures constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against settling airborne dust, lint, fibers, and flyings; and to provide a degree of protection against dripping and light splashing of liquids.

Type 6 - Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against hose-directed water and the entry of water during occasional temporary submersion at a limited depth; and that will be undamaged by the external formation of ice on the enclosure.

Type 6P - Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against hose-directed water and the entry of water during prolonged submersion at a limited depth; and that will be undamaged by the external formation of ice on the enclosure.

Type 12 - Enclosures constructed (without knockouts) for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed

equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flyings; and against dripping and light splashing of liquids.

Type 12K - Enclosures constructed (with knockouts) for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flyings; and against dripping and light splashing of liquids.

Type 13 - Enclosures constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flyings; and against the spraying, splashing, and seepage of water, oil, and noncorrosive coolants.

History: Amended effective January 1, 1981; April 1, 2002.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-19. Inspection fees.

1. All electrical installations, including new jobs and additional work on old installations, made in this state, shall have an electrical wiring certificate or e-cert properly executed by the master or class B electrician supervising the installation of electrical wiring. The state electrical board shall prescribe such form and shall have on hand a supply of such certificates for distribution to master and class B electricians. Such certificate shall consist of the original and five copies.

2. Before work commences on any electrical installation where a new entrance is installed, an existing entrance is altered, a building is moved, where a mobile home feeder is installed, or where the cost of the repair work or additional installation exceeds three hundred dollars, the master or class B electrician supervising such installation shall execute an electrical wiring certificate and distribute the various copies as directed. The goldenrod copy of the certificate shall be forwarded to the state electrical board or city electrical inspection authority having jurisdiction and the canary copy to the power company before work is commenced.

   Within fifteen days of completion, use, or occupancy, whichever is foremost, the white and green copies shall be forwarded to the office of the state electrical board, along with the proper fee. The pink copy shall be retained by the master or class B electrician and the manila copy shall be left in, or on the panel or given to the owner. All six copies shall contain a description of the work and the legal description of the location. Certificates with job cost of ten thousand dollars or less are valid twelve months from the original filing date. The wiring certificate shall be submitted with a proper description of work completed and with

the proper fee. A new wiring certificate shall be filed on all unfinished work.

3. The electric wiring certificates are available from the state electrical board at Bismarck, North Dakota, upon request of any master or class B electrician holding a proper current license from the electrical board. The master or class B electrician shall be held responsible for all certificates issued to that person. A charge of fifteen dollars to cover board costs shall be imposed on each lost wiring certificate.

4. A copy of an electrical wiring certificate shall be filed with the power supplier before an electrical installation may be energized.

5. Inspection fees shall be as follows:

Job Cost	Inspection Fee
Up to $300.00	$25.00 (minimum fee)
$300.00 to $3,000.00	$25.00 for the first $300.00 plus 2% on balance up to $3,000.00
$3,000.00 to $10,000.00	$79.00 for the first $3,000.00 plus 1.5% on balance up to $10,000.00
$10,000.00 to $15,000.00	$184.00 for the first $10,000.00 plus 1% on balance up to $15,000.00
$15,000.00 to $100,000.00	$234.00 for the first $15,000.00 plus 1/2 of 1% on balance up to $100,000.00
Over $100,000.00	$659.00 for the first $100,000.00 plus 1/4 of 1% on balance

Inspection fees shall accompany the copies of wiring certificates which shall be forwarded to the State Electrical Board, Box 857, Bismarck, North Dakota 58502.

6. Whenever an electrical installation made by or under the supervision of a master or class B electrician is commenced or in use without submitting an electrical wiring certificate, as directed in subsection 2, the certificate may be considered late and the normal inspection fee, as required under this section, is increased in the amount of fifty dollars. In addition, when time and travel are expended by employees of the board to obtain a late certificate, an investigative fee may be charged to cover the costs incurred. Costs are to be calculated at a rate of fifty dollars per hour and mileage rates currently allowed by North Dakota Century Code section 54-06-09 per mile of travel.

7. Corrections. Whenever a correction order is written and corrections are not completed within the allotted time, there shall be an administration charge of fifty dollars, which shall be paid to the board by the master or class B electrician.

8. All reinspections shall be paid for by the electrical contractors at a cost of fifty dollars per hour with a minimum charge of one hundred dollars.

9. The electrical inspection fee shall be based on the total amount of the electrical contract or total cost to the owner including extras.

10. The following items need not be included in the cost:

    a. Appliances, including dishwashers, heat pumps, air-conditioners, disposals, and similar equipment.

    b. Heating, ventilating, and air-conditioning (HVAC) units.

    c. Electric motors, PLC, generators; and

    d. Industrial machines.

11. The electrical contractor is responsible to collect the proper inspection fee on each installation. When the owner furnishes the material and the electrical contractor furnishes the labor, the owner shall provide the electrical contractor with the total amount expended for electrical materials used in connection with the installation, and the electrical contractor shall then calculate and collect the necessary inspection fee from the owner. Whenever electrical materials are donated or removed from an existing installation and placed at another location or labor is donated to an installation, the electrical contractor shall estimate the cost of these materials and labor and include the amount in the job cost for the purpose of calculating the proper inspection fee.

12. The inspection fee for all electrically driven irrigation machines and motor-driven passenger or freight elevators and dumbwaiters installed in North Dakota shall be as follows:

    Elevators and dumbwaiters having horsepower rating up to 5 horsepower - $20.00

    Elevators and dumbwaiters having horsepower rating 5 horsepower through 15 horsepower - $40.00

    Elevators and dumbwaiters having horsepower rating over 15 horsepower - $60.00

    Electrically driven irrigation machines - $50.00

    The master electrician (restricted) having supervision of elevator or dumbwaiter installations shall obtain electrical wiring certificates from the state electrical board. The certificate form shall be completed, signed by the master electrician (restricted), and forwarded to the state electrical board, Bismarck, North Dakota, with the inspection fee.

The companies having supervision of electrically driven irrigation machine installations shall submit reports to the state electrical board. The report shall be completed, signed by owner or manager, and forwarded to the state electrical board, Bismarck, North Dakota, with the inspection fee within fifteen days of completion or use, whichever is first.

13. Requested inspections. For inspections not covered in this section or special services, the fee shall be fifty dollars per hour, including travel time, plus mileage rates currently allowed by North Dakota Century Code section 54-06-09 per mile traveled.

14. For self-wire inspections on wiring done by the owner, the inspection fee shall be as stated in this section, except the minimum shall be fifty dollars. Owner wiring shall be done on residential and farmstead property occupied by the owner. Certification and inspection are required as stated in subsection 1. The owner is required to notify the state electrical board or authority having jurisdiction before work commences. Requests for inspection of owner-wired installations shall be in writing and shall be accompanied by a print or drawing depicting the wiring to be done.

History: Amended effective January 1, 1981; January 1, 1984; October 1, 1987; January 1, 1990; March 1, 1990; January 1, 1993; February 1, 1996; January 1, 1999; April 1, 2002; April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

24-02-01-20. Severability. If any section, sentence or clause, or provision of this chapter or the applicability thereof to any person circumstances is held invalid, the remainder of this chapter and the application of such provision to other persons or circumstances shall not be affected thereby.

History: Amended effective January 1, 1999.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-05

24-02-01-21. Examination and annual license fees.

1. The examination fees are as follows:
   a. Master examination $50.00
   b. Journeyman examination $25.00
   c. Class B examination $40.00
2. The annual license fees are as follows:
   a. Master license $50.00
   b. Journeyman license $25.00

c. Class B license $40.00

d. Apprentice registration $10.00

3. Licenses renewed after the expiration date require a reinstatement fee as follows:

a. Master license $50.00

b. Journeyman license $25.00

c. Class B license $40.00

d. Apprentice registration $10.00

History: Effective August 1, 1988; amended effective January 1, 1990.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-13

24-02-01-22. Continuing education requirements.

1. Each master, journeyman, and class B electrician license shall not be renewed unless the continuing education requirements of North Dakota Century Code section 43-09-15.1 are met, of which a minimum of fifty percent of the hours shall be based on the 2005 edition, National Electrical Code. The remaining credits shall be subjects related to the electrical industry. Approval of the course curriculum is at the discretion of the North Dakota state electrical board.

   a. Electrical continuing education programs will be accepted from technical or trade schools or colleges, electrical trade associations, or individual commercial providers.

   b. Courses, seminars, and instructors shall have prior approval by the North Dakota state electrical board to receive credit. Request for approval of courses, seminars, and instructors shall be made no later than ten days prior to the board meeting. Board approval of courses, seminars, and instructors accepted expires when the state electrical board adopts an updated edition of the National Electrical Code.

   c. Application for approval of courses and instructors shall be on a form provided by the North Dakota state electrical board. A complete description (detailed curriculum outlining the subject matter along with the time and sequence of each item) or copies of all materials provided to the attendants shall be submitted.

   d. Continuing education programs held in other states and not granted prior approval according to this section may be considered for credit if the board is provided with evidence that the educational programs meet the requirements of the state electrical board and

are approved for required continuing education credits by the public authority for licensing electricians in that state.

e. The board shall be notified in writing no later than fifteen days prior to the date, time, and location of the presentation. A representative of the North Dakota state electrical board shall be able to attend without charge and have the authority to audit or review continuing education presentations.

f. The board shall withdraw approval of any educational program not in compliance with this section.

g. The provider of the presentation shall forward an attendance list to the board on a form supplied by the board within fifteen days following the presentation but no later than March thirty-first of that year. A certificate of completion shall also be provided to each licensee in attendance. Each certificate of completion and attendance list shall include the name of the provider, the name of the instructor, the course identification number, the date and location of presentation, the number of code and noncode hours of instruction for continuing education units, the electrician's name, and the electrician's license number or social security number. It is the responsibility of the licensee to have a copy of this certificate of completion. The certificates shall be sent to the board only if requested to do so by the board.

h. Continuing education credits are valid for a period up to two license renewal periods.

2. Instructors shall submit their qualifications to the state electrical board prior to the presentation of the course or seminar. Courses will not be approved unless the instructor has one or more of the following qualifications:

a. A master electrician with at least one year's experience in electrical inspection.

b. A journeyman or master electrician who is certified as an instructor through a vocational education department.

c. A person with a valid teaching accreditation from a trade or technical school, college, or university teaching an electrical curriculum.

d. A registered or licensed electrical engineer with at least four years' experience in design of premise electrical wiring systems.

e. A representative from the national fire prevention association, testing laboratories, international association of electrical inspectors, and other product manufacturer representatives with five years' practical experience in the subject taught.

f. Instructor of an apprenticeship training program.

History: Effective January 1, 1999; amended effective April 1, 2005.
General Authority: NDCC 43-09-05
Law Implemented: NDCC 43-09-21, 43-09-22

APPENDIX
Short Cut
At 75° C

Voltage Drop Formulas 167° F

Voltage drop = $\frac{K \times L \text{ ft.} \times I}{C.M.A.}$

or

C.M.A. = $\frac{K \times L \text{ ft.} \times I}{\% \text{ drop} \times \text{voltage}}$

L = length in feet, one way

I = load in amps

E = Volts

C.M.A. = circular-mil area

K-factor = 25.8 multiplying factor for copper, 42.4 multiplying factor for aluminum at 75° C.

Percent drop = permissible voltage drop times voltage of circuit as follows:

3% of 208 = 208 x .03 = 6.24 volts

3% of 120 = 120 x .03 = 3.6 volts

3% of 240 = 240 x .03 = 7.2 volts

5% of 240 = 240 x .05 = 12.0 volts

Example:

240 volts, 1,000 ft. distance, 10 ampere load, 5% drop

25.8 x 1,000 = 25,800 x 10 = 258,000

258,000 divided by 26,250 (C.M.A. of No. 6) = 9.8 volts (less than 5%)

258,000 divided by 16,510 (C.M.A. of No. 8) = 15.6 volts (more than 5%)

120 volts, 8 ampere load, 100 ft. distance, 3% drop

25.8 x 100 = 2,580 x 8 = 20,640

20,640 divided by 6,530 (C.M.A. of No. 12) = 3.16 volts (less than 3%)

20,640 divided by 4,107 (C.M.A. of No. 14) = 5.0 volts (more than 3%)

or

25.8 x 8 amps x 100 ft. = 20,640

20,640 divided by 3.6 (volts representing 3%) = 5,733 C.M.A. (No. 12)

For 3-phase circuits, use formula, then multiply the results by .86.

Fire Alarm System Condensed Guide

O - NOT required X - required

Occupancy	Manual Stations	Smoke Detector	Heat Detector	Flow Switch	Fire Station Alarm
Assembly under three hundred	0	0	0	0	0
Assembly over three hundred	X Note 1	0	0	0	0
Amusement buildings	X	X	0	X	X
Hotel-motel					
Nineteen rooms or less	0	X Note 2	0	0	0
Three or more story *	X	X	0	0	0
Hotel-motel					
Twenty rooms or more * and congregate residences	X	X Note 2	X	X	0
Commons area					
Hotels-motels-apartment houses	X	X	X Note 3	Note 5	
Educational					
North Dakota Century Code Section 18-12-16					
Institutional *	X	X	X	X	X
Office - High-rise	X	X	X	X	
Apartments (see #2 above)	0	X	0	0	0
Industrial - Check with the local fire authority or the state fire marshal					
Office building - Check with local jurisdiction					

* State Department of Health rules.

Note 1. Placement of devices shall be at exit on each level.

Note 2. Detectors required in each sleeping room and one detector for each seventy-five feet [22.86 meters] of hallway.

Note 3. When automatic sprinklers and flow detectors are installed, they shall be connected to the alarm system. Heat detectors are required in mechanical rooms, laundry rooms, and storerooms.

Note 4. Institutional includes hospitals, nursing homes, jails, and similar facilities, including any occupancy where movement is restricted.

Note 5. If equipped with sprinkler.

Note 6. Emergency voice alarm and signal.

Note 7. One hundred or more sprinkler heads.

All signaling devices for all occupancies shall meet Americans with Disabilities Act (ADA) requirements (check ADA requirements).

Smoke detectors in hotels, motels, and apartments are not to be tied to the central alarm system (alarm in room or apartment only).

Central alarm trouble indicator shall be located where it will be heard.

Systems with two or more zones shall have an annunciator panel located at an entrance approved by the local fire department.

Cities shall have additional or more stringent requirements.

Be aware the table is the minimum and the owner or designer shall ask for more.